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ABSTRACT

The differences in the personality and social backgrounds of college students majoring in science and nonscience fields were assessed with 91 black and 109 white students. The following categories of majors were compared: natural science, social science, and nonscience (education, business, history, and all others). The personality and attitudes of students were assessed by the 16PF, Bem Sex-Role Inventory, and the Attitude Toward Women Scale. Data were also collected on birth order, number of siblings, and social class. The black natural science majors were from a higher social class and more practical and toughminded than were the black social and nonscience majors. The white natural science majors were more masculine sex-role oriented and more sober than were the white social and nonscience majors. In comparison with nonscience majors, natural science majors were more often first born and from higher social class families with fewer siblings. There were more racial differences found than college major differences; however, black and white science majors were more similar than black and white students in the other two college major groups. It is suggested that knowledge about the characteristics of black scientists may be helpful in identifying prospective scientists. (Author/SW)

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Predictors of Scientific Majors for Black and White College Students

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Abstract

The differences in the personality and social backgrounds of science and non-science majors were assessed. Ninety-one black and one hundred and nine white college students were categorized into the following three groups according to their college major: natural, social or non-science. The personality and attitudes of the students were assessed by the 16PF, Bem Sex-Role Inventory and the Attitude Toward Women Scale. Data was also collected on birth order, number of siblings and social class level. The black natural science majors were from a higher social class and more practical and toughminded than the black social and non-science majors. The white natural science majors were more masculine sex role oriented and more sober than the white social and non-science majors. Natural science majors were more often first born, from higher social class families with fewer siblings than non-science majors. There were more racial differences found than college major differences, however, black and white science majors were more similar than black and white students in the other two college major groups. Black and white natural science majors held both common and unique characteristics.

Predictors of Scientific Majors for Black and White College Students

Roe (1953) studied 64 white male scientists to determine if they possessed uinque characteristics. Her subjects included biologists, physicists, psychologists and anthropologists and she found distinct patterns in the life histories of these men. The scientists came from professional families who placed a high value on acquiring knowledge for the sake of knowledge. Excluding the social scientists, they were introverted and had private interests shared with few friends. All enjoyed school and studying, were avid readers, and possessed a high level of intellectual functioning. Although these common traits were found, unique personality patterns for each discipline emerged. Biologists possessed a strong desire for control which was absent from the personality structure of the physicists and social scientists. The physicists were anxious and introverted while the social scientists were concerned about human relations. Roe believed that the social scientist experienced more personal pressures during childhood which resulted from role confusion at home and "difficulties in achieving full masculine status" (p. 237). She maintained that the greater proportion of her subjects had more than the usual number of insecurities but refused to support the belief that a good scientist must be somewhat neurotic.

Since the in-depth analysis of Roe (1953), various researchers have studied the social and behavioral development of scientists (Cooley, 1963; Knapp & Goodrich, 1952; Zuckerman, 1977). Cattell, Ebers and Tatsuoka

(1980) reported that their collective group of scientists lacked affection and possessed high intelligence, desurgency, a skepticism about standard moral values, low guilt proneness, radicalism, self-sufficiency, and the exacting standards of a strong self-sentiment (p. 215). Also, they perceived the scientific profile as high functional which they thought was necessary to promote creative work. They felt that the ingredients for creativity included temperament, forcefulness, and independence combined with an introverted, restrained personality. Their results on specific scientific disciplines indicated that physicists were the most introverted, biologists showed a higher independence-of-mind score, chemists resembled physicists but were not as introverted, and psychologists differed from other scientists by being more radical and dominant. Similar findings have been reported by other researchers (see Erez & Shneorson, 1980; Welch, 1969).

Some of the research that has attempted to identify variables that discriminate scientists from non-scientists has focused on college students. Baker (1982) studied the differences in personality, attitudes and cognitive abilities of 180 male and female science and non-science majors. The science majors had higher math scores, better attitudes toward science and better spatial ability than non-science majors. Science majors possessed the intuitive, thinking, judging personality type while non-science majors were more sensing, feeling and perceiving; as assessed by the Myer's Briggs Type Indicator. The male and female physical science majors were better in math and more strongly thinking than the biological majors. The female science majors had more stereotypically

masculine traits than female non-science majors. This difference resulted from the high masculine scores obtained by the female physical science majors because the female biological majors were more feminine than masculine.

The existence of a scientific personality has been well documented; however, past theories and previous research have, for the most part, focused exclusively on white male scientists. Little is known about the social background and personality structure of black scientists. In a recent study, Pearson (1982) studied the social backgrounds of 444 black male and 113 black female natural and social scientists. The typical black scientist was male, from an intact lower-middle class family with an average of two siblings and raised in a predominantly black neighborhood. They attended predominantly black undergraduate colleges, graduated with B averages, attended midwestern graduate schools and returned to predominantly black institutions to teach. Pearson (1982) felt that the backgrounds of black scientists (excluding obvious racial differences) resembled the findings reported by Roe (1935) for white scientists. The black scientists reported their enjoyment in building things during their youth, were avid readers and enjoyed school and studying. About three-fourths of the black scientists reported an interest in science for the sake of acquiring knowledge and almost one-half were influenced academically by either a parent or teacher. Roe (1953) felt that high intellectual capacity was not the most important prerequisite for the scientist. Instead, a scientist must be raised in an environment that encourages learning "for its own sake" and not for external rewards. The scientists studied by Roe (1935) and Pearson (1982) were raised in this kind of environment.

Tilford and Allen (1974) compared the social backgrounds of black science majors with black non-science majors attending predominantly black schools. The science majors had higher ACT scores, and more favorable attitudes toward science than the non-science majors. The two groups did not differ on the degree to which family members or teachers influenced their choice of majors. Regardless of college major, the influence of the mother on choice of major appeared to be stronger than other family members. These researchers included social scientists in their non-science area which may account for the lack of significant differences between the science and non-science groups in areas such as social class, number of siblings, birth order, and high school science activity.

Black scientists have been largely ignored in the literature until the 1970s. Much of the data collected since that time has focused on demographic characteristics or the social backgrounds of black scientists (see Jay, 1971; Wilburn, 1977; Young & Young, 1974). There have been few attempts to study the personality profile of black scientists or science majors to discover the existence of common and unique relationships to the scientific personality. The present study was designed to assess the attitudes, personality and social backgrounds of black and white natural, social and non-science majors. It was hypothesized that black and white science majors would share some common and unique characteristics. However, it was also hypothesized that there would be differences in those variables that successfully discriminated black and white college major groups.

Method

Subjects

Subjects were 91 black and 109 white college students attending universities in the Southeast. They were members of the majority racial group in their respective universities. There were 73 males and 127 females with a mean age of 21 years. The white students were upper middle class and the black students were lower middle class as assessed by the Hollingshead Index of Social Position (Hollingshead, 1957). All students were at least second semester sophomores to ensure that they had declared a major. Students were either participants in an Introduction to Psychology subject pool or were given extra credit for participating through an upper division class.

Measures

A questionnaire was constructed to gather information on the subjects' sex, race, college major, college classification, self-reported grade point average, birth order, number of siblings, occupation and educational attainment of mother and father.

The personality and attitudes of the students were assessed by three measures. The BEM Sex Role Inventory (BSRI) was administered to determine the extent to which one's self-description is masculine, feminine, or androgynous. The short version of the Attitude Toward Women Scale (Spence, Helmreich, & Stapp, 1973) was administered to assess liberal versus conservative attitudes toward women. The short version of the Attitude Toward Women Scale (ATWS) consists of 25 items containing questions about the rights and roles of women in the areas of vocation, education, intellectual activities, dating and marital relations. It contains a Likert-type scale in

which each item is scored from 0 (most traditional) to 3 (profeminist). The 16 Personality Factor inventory was used as a general measure of personality. The 16 PF measures 16 primary personality traits and 4 secondary traits. It has been used extensively in research to differentiate the personalities of those in various professions. Ward, Cunningham, and Wakefield (1976) found a strong relationship between the 16 PF and the Vocational Preference Inventory (Holland, 1973).

Procedure

Subjects were administered the background questionnaire, BSRI, ATWS, and 16 PF, respectively, in group sessions by a same-race experimenter.

Results

Subjects were divided into one of three college major areas: social science, natural science or non-science, by using information supplied on the background information sheet. The majors were delineated as follows: natural science--math, physics, biology, chemistry; social science--anthropology, economics, psychology, political science, sociology; non-science--education, business, history, and all others. The means for these three groups are presented in Table 1, classified by race.

Insert Table 1 about here

In order to determine those variables that could successfully discriminate science from non-science majors, separate discriminate analyses were performed by race with college major as the dependent variable and the ATWS, BSRI, 16 PF, birth order, social class, and number of siblings as independent variables. For the black students, three variables significantly

discriminated the college majors: social class, $F(2, 78) = 4.17$, $p < .02$, toughminded versus tenderhearted, $F(2, 78) = 3.18$, $p < .05$, practical versus imaginative, $F(2, 78) = 4.11$, $p < .02$. Further analyses revealed that the natural science majors ($\bar{X} = 33$) were of a higher social class than either the social science ($\bar{X} = 46$) or non-science majors ($\bar{X} = 49$). Natural science majors were more toughminded ($\bar{X} = 4.73$) than social science ($\bar{X} = 6.07$) or non-science majors ($\bar{X} = 6.32$). Natural science majors ($\bar{X} = 3.33$) were also more practical than social science ($\bar{X} = 4.95$) and non-science ($\bar{X} = 4.29$) majors. There was one significant canonical discriminant function found with a Wilks' Lambda of .31, $X^2(52) = 76.15$, $p < .02$, and accounted for 61 percent of the variance in the scores. The canonical correlation for this function was .71.

The discriminant analysis for white students revealed quite different results than those obtained for blacks. Two variables significantly discriminated the college major groups: sex role orientation, $F(2, 104) = 3.25$, $p < .04$, sober versus happy-go-lucky, $F(2, 104) = 4.71$, $p < .01$. The natural ($\bar{X} = -.29$) and social science ($\bar{X} = -.20$) majors were more masculine oriented than non-science majors ($\bar{X} = .16$). The natural science majors ($\bar{X} = 5.14$) were more sober than the social science ($\bar{X} = 6.62$) or non-science majors ($\bar{X} = 6.14$). There were two functions found with Wilks' Lambdas of .53 and .78 but neither was significant. The canonical correlation for the two functions were .57 and .46, respectively.

Classification functions were calculated for the black and white students separately to compare predicted group membership to actual group membership. Results indicated that 80 percent of the black students and 71

percent of their white counterparts were correctly classified into actual college majors.

The final discriminant analysis calculated included all subjects. The independent variables were the same as the previous analyses but the dependent variable included the three college major groups by race. Seven variables significantly discriminated the six college major by race groups: birth order, $F(5, 182) = 3.54$, $p < .01$, social class, $F(5, 182) = 30.25$, $p < .001$, number of siblings, $F(5, 182) = 7.57$, $p < .001$, intelligent versus less intelligent, $F(5, 182) = 14.90$, $p < .001$, affected by feelings or emotionally stable, $F(5, 182) = 2.67$, $p < .02$, sober versus happy-go-lucky, $F(5, 182) = 5.78$, $p < .001$, practical versus imaginative, $F(5, 182) = 2.83$, $p < .02$. Further analyses revealed that the natural science majors were most often first born, from the higher social class families, and had fewer siblings than the non-science majors. The white science majors scored significantly higher on the intelligence questions than the white non-science majors and all majors for the black students. Black and white natural science majors were more emotionally stable, sober, and practical than non-science majors.

The discriminating power of the independent variables was determined by computing Wilks' Lambda. The largest discriminate function was the first with a Wilks' Lambda of .15 and a canonical correlation of .84 and accounted for 76 percent of the predictable group variation. The Chi-square test revealed that the first function significantly discriminated the groups, $X^2(130) = 319.78$, $p < .001$. The group centroids for the first two discriminant functions are presented in Table 2. The first function appears to

discriminate the white students from the black natural science majors, black social and non-science majors. These centroids are plotted in Figure 1. The second discriminant function appears to separate black and

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Insert Table 2 and Figure 1 about here

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white students instead of the major groups. The second discriminant function only accounted for 9 percent of the group variation.

Data on the correct classification of predicted group membership to actual group membership are presented in Table 3. Results indicated that, in general, the black students were more correctly classified than the white students. The black and white science majors were more correctly classified than the other groups. The best classified group was the black natural science majors (67%) while the least classified groups were the white natural and non-science majors. Sixty-two percent of all subjects were correctly classified.

Insert Table 3 about here

Separate 2(Race) x 3(College Major) ANCOVAs were calculated for the 16 PF dimensions, ATWS, BSRI, and several other variables as the dependent variable and social class as the covariate (see Table 4). Racial differences emerged on 7 variables: intelligence, $F(1, 187) = 49.88$, $p < .001$,

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Insert Table 4 about here

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sober versus happy-go-lucky, $F(1, 187) = 6.08$, $p < .02$, practical versus imaginative, $F(1, 187) = 4.07$, $p < .05$, conservative versus experimenting,

$F(1, 187) = 4.54$, $p < .03$, undisciplined self-conflict versus control, $F(1, 187) = 5.50$, $p < .02$, birth order, $F(1, 182) = 7.56$, $p < .01$, and number of siblings, $F(1, 182) = 13.67$, $p < .001$. White students were more intelligent, happy-go-lucky, imaginative, conservative and possessed more undisciplined self-conflict than the black students. They also had fewer siblings and were more often first born in comparison to black students.

The three college major groups differed on four variables: reserved versus outgoing, $F(2, 187) = 2.95$, $p < .05$, sober versus happy-go-lucky, $F(2, 187) = 6.77$, $p < .001$, practical versus imaginative, $F(2, 187) = 3.02$, $p < .05$, and sex-role orientation, $F(2, 182) = 4.25$, $p < .02$. The natural science majors were more reserved, sober, practical and male sex-role oriented than the social or non-science majors.

The mean scores for black and white students of each major group were analyzed separately for intragroup comparisons (see Table 5). Regardless

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Insert Table 5 about here

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of major area group, white students were of a higher social class and scored higher on the intelligence dimension than blacks. In addition, the white natural science majors were more imaginative and self-sufficient than their black counterparts, while the white non-science majors were more happy-go-lucky, trusting, and apprehensive with fewer siblings than their black peers. White social science majors were more assertive, happy-go-lucky, astute, tense, first born with fewer siblings than black social science majors.

Discussion

The primary focus of this study was to assess the personality and social backgrounds of science and non-science majors and determine if the scientific personality profile generally associated with white scientists was prevalent among black science majors in college. Previous research suggests that similarities do exist in family background and intellectual capacity (Pearson, 1982). There were more black-white difference in social background, personality and attitudes than differences between science and non-science majors in the present study. Regardless of college major, the white students were most often first or second born (due in large measure to their origins in higher social class families with fewer siblings), and scored higher in the areas of intelligence and emotional stability. Also, white students were more assertive, happy-go-lucky, imaginative, forthright, self-assured, and independent than black students.

Previous research supports findings of racial differences in the social class level of college students (Bayer, 1972; Thomas, 1981), and family size. In addition, there are ample research findings of black-white differences on measures of intelligence and other standardized tests, especially verbal measures that resemble the analogies used on the 16 PF. The existence of a "black personality" has also been frequently discussed. Some theorists have proposed deficit models and focused on the inadequacies of the black personality (Kardiner & Ovesey, 1951), while more contemporary approaches emphasize the uniqueness of black personality patterns (Akbar, 1976; Cross, 1978; Harrell, 1979; Jenkins, 1982). However, regardless of the conceptual framework adopted, black-white personality differences exist. Therefore,

it is not surprising that racial differences in the areas of family background, social class, intelligence and personality emerged in the present sample.

In the present study, race was confounded with social class. Even when social class was controlled, racial differences still persisted. These data suggest that one cannot properly or adequately analyze the nature of black scientists without taking into account their socioeconomic backgrounds, similarities to other blacks, and their differences from whites. Those variables that successfully discriminated black and white social, natural and non-science majors were almost identical to those discriminating all blacks from all whites (social class, birth order, intelligence). These findings again suggest that racial (and to a lesser extent social class) differences were stronger than differences between college majors.

Black natural scientists were of a higher social class and were more toughminded and practical than black social or non-science majors. The social class finding is supported by Pearson (1982) who reported that the majority of his black respondents had their origins in families where the parents were professionals. Black natural science majors more frequently than non-science majors came from families where at least one parent was college educated. These findings are somewhat contradictory to those obtained by Tilford and Allen (1974) who found that "the family background factors of socioeconomic status, number of siblings, and ordinal position of black college students exercised little influence on selection of the major field of study" (p. 124). Among black respondents in the present study, social class was one of the most discriminating variables. Dillard

(1976) also found that socioeconomic status had the strongest predictive value on career maturity of black sixth-grade students. Other researchers have found a relationship between socioeconomic status and choice of a science major (see, for example, Cooley, 1963).

Cattell et al. (1980) described those scoring on the low end of the "toughminded versus tenderminded" dimension (I) as representing the "tough, masculine, practical, mature, group-solidarity-generating and realistic (no-nonsense) temperamental dimension" (p. 93). This has been associated most frequently with chemical engineers and commercial airline pilots. Cattell described the basic scientific profile as one that included high sensitivity (I); however, the chemists were found to have lower I and M scores than some other scientific groups. These findings support the belief that black natural scientists must be more mature and tough than white scientists. It resembles the finding that women scientists express some of the same personality characteristics as male scientists along with unique qualities that allow them to cope as a minority (Andersen, 1973). Cattel described those that were low on M (practical versus imaginative) as concerned with immediate interests, guided by objective realities and possessing practical judgment. Black natural scientists were very low on this dimension. However, high M scores are thought to be possessed by more creative researchers and the scientific profile possesses an average M level.

The hypothesis that black and white science majors would have some common and unique characteristics was supported. Black science majors possess some unique characteristics that closely parallel those that

distinguish whites from blacks in general. Whites of all majors were of a higher social class than their black peers. Black natural science majors, however, were of a higher social class than black social and non-science majors. White students regardless of majors were more imaginative than black natural scientists who, in turn, were more imaginative than black natural scientists, while black non-science majors were least imaginative of all. In comparison with blacks, white students tend to possess more of the characteristics associated with scientists. Among blacks, however, only natural science majors approached the scientific profile. It is not surprising that white students should possess more of the scientific qualities than their black counterparts because the standards for judging scientific potential were normed on white scientists.

When making racial comparisons within each college major group, the black and white natural science majors were more similar than the other major groups, differing only on two personality dimensions. White science majors were more imaginative and self-sufficient than the black science majors. The black and white social science majors were most dissimilar and differed on four personality and two social variables. The white social science majors were more assertive, happy-go-lucky, astute, tense, and first born with fewer siblings. In addition, white non-science majors were more happy-go-lucky, trusting, and apprehensive with fewer siblings than their black counterparts. These were differences over and beyond the racial differences in social class and intelligence.

Black students who select science as a major most often come from middle-class professional backgrounds, as in the present study. Because

blacks are overrepresented in the lower social class, any effort to increase the number of black scientists will necessitate identifying scientific talent among lower-class black students who might otherwise select to enter non-science major areas. There is evidence that low-income black students need to be educated about career options. Smith (1976) studied reference group perspectives and vocational maturity of black low-income seniors and found black students to possess low vocational maturity in general. However, those low-income blacks who possessed middle class reference group identification had higher vocational maturity than black students adhering to lower-class reference group identification. Merton (1968) defined "anticipatory socialization" as the process occurring when one adopts the reference perspective of a group in which one does not belong. Smith (1976) reasoned that reference group perspective was a more viable concept for explaining vocational maturity than social class alone. She suggested that counselors should work with low income black youth to alter reference group identification and consequently enhance vocational maturity and facilitate movement into the middle class. Likewise, it appears that altering the reference group perspective of black low-income college students may increase their representation in the scientific careers.

The white college majors were not discriminated as well as the black college majors, as evidenced by the lack of a significant discriminant function, and the lower correct classification of white majors (71%) as compared with black majors (80%). The white natural science majors were more masculine than the non-science majors and scored lower on the F dimension (sober vs. happy-go-lucky). Cattell et al. (1980) described

the low F as desurgency and believed this dimension to be one of the most important components of extraversion. The low F person is silent, introspective and cautious. Physicists have low scores on this dimension. The basic scientific profile includes low F scores. The second hypothesis was supported. Those variables that successfully discriminated the black college majors differed from those that discriminated the white college majors.

Black scientists appear to be a unique group, sharing common qualities with white scientists but being more similar to blacks in general. Further research needs to expound on the qualities of black scientists so that blacks with scientific potential might be more easily identified and encouraged to pursue scientific careers. Knowledge about the personalities and attitudes of black scientists may be helpful in identifying prospective scientists. As Smith (1975) questioned the appropriateness of vocational theories and interest inventories for blacks of all social class levels, one must also question the appropriateness of white predictors of scientific ability for blacks of all social levels. Future research is needed to clarify the characteristics of black scientists and find ways to increase their numbers, especially among lower class blacks.

W.F.U.

References

Akbar, N. Rhythmic patterns in African personality. In L. King, V. Dixon, & W. Nobles (Eds.), African philosophy: Assumptions & paradigms for research on black persons. Los Angeles, CA: Fanon Center Publication, 1976.

Andersen, J. V. Psychological determinants. Annals of the New York Academy of Science, 1973, 208, 185-189.

Baker, D. Differences in personality, attitudes, and cognitive abilities found among biological, physical science and non-science majors, 1982. Unpublished manuscript.

Bayer, A. The black college freshman: Characteristics and recent trends. American Council of Education Research Reports, Vol. 8, No. 1. Washington: ACE, 1972.

Cattell, R., Ebers, H., & Tatsuoka, M. Handbook for the 16 Personality Factor Questionnaire. Champaign, IL: Institute for Personality and Ability Testing, 1980.

Cooley, W. Career development of scientists. Cooperative Research Project No. 436. U. S. Office of Education, U. S. Department of Health, Education, and Welfare, 1963.

Cross, W. The Thomas and Cross models of psychological nigrescence: A review. Journal of Black Psychology, 1978, 5, 13-31.

Dillard, J. Relationship between career maturity and self-concept of suburban and urban middle- and urban lower-class preadolsecent black males. Journal of Vocational Behavior, 1976, 9, 311-320.

W.F.U.

Erez, M., & Shneorson, A. Personality types and motivational characteristics of academics versus professionals in industry in the same occupational disciplines. Journal of Vocational Behavior, 1980, 17, 95-105.

Harrell, J. Analyzing black coping styles: A supplemental diagnostic system. Journal of Black Psychology, 1979, 5, 99-108.

Holland, J. Making vocational choices: A theory of careers. Englewood Cliffs, NJ: Prentice-Hall, 1973.

Hollingshead, A. Two-factor index of social position, 1957. Unpublished manuscript.

Jay, J. Negroes in science: Natural science doctorates, 1876-1969. Detroit: Balamp, 1971.

Jenkins, A. The psychology of the Afro-American: A humanistic approach. New York: Pergamon Press, 1982.

Kardiner, A., & Ovesey, L. The mark of oppression. New York: W. W. Norton, 1951.

Knapp, R., & Goodrich, H. Origins of American scientists. Chicago: University of Chicago Press, 1952.

Merton, R. Social theory and social structure. New York: The Free Press, 1968.

Pearson, W. The social origins of black American doctorates in the sciences. Sociological Spectrum, 1982, 2, 13-29.

Roe, Anne. The making of a scientist. New York: Dodd, Mead, 1953.

Smith, E. Profile of the black individual in vocational literature. Journal of Vocational Behavior, 1975, 6, 41-59.

W.F.U.

Smith, E. Reference group perspectives and the vocational maturity of lower socioeconomic black youth. Journal of Vocational Behavior, 1976, 8, 321-336.

Spence, J., Helmreich, R., & Stapp, J. A short version of the Attitudes Toward Women Scale (ATWS). Bulletin of the Psychonomic Society, 1973, 2, 219-220.

Thomas, G. The effects of standardized achievement test performance and family status on black-white college access. In G. Thomas (Ed.), Black students in higher education. Westport, CT: Greenwood Press, 1981.

Tilford, M., & Allen, D. Science and non-science majors in three predominantly black colleges. The Journal of Negro Education, 1974, 43, 117-126.

Ward, R., Cunningham, C., & Wakefield, J. Relationship between Holland's VPI and Cattell's 16 PF. Journal of Vocational Behavior, 1976, 8, 307-312.

Welch, W. Some characteristics of high school physics students: Circa 1968. Journal of Research in Science Teaching, 1969, 6, 142-147.

Wilburn, A. Current status of ethnic/racial minorities in science and engineering professions. Journal of the Society of Ethnic and Special Studies, 1977, 1, 31-35.

Young, H., & Young, B. Scientists in the black perspective. Louisville, KY: The Lincoln Foundation, 1974.

Zuckerman, H. Scientific elite: Nobel laureates in the United States. New York: Free Press, 1977

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Table 1

Means of All Dependent Variables by Race and College Major

	Social Sciences		Natural Science		Non-Science	
Variable	Black	White	Black	White	Black	White
Birth Order	3.03	1.81	2.33	1.83	2.68	2.20
Social Class	46	21	33	19	49	21
Number of Siblings	4.24	2.76	3.73	2.92	4.82	3.14
BSRI	-.05	-.20	-.27	-.29	.25	.14
ATWS	55	57	54	56	51	54
16 PF						
Reserved vs. Outgoing	6.0	5.76	5.67	5.08	6.07	5.98
Intelligent	4.55	6.71	4.13	6.91	4.00	6.22
Emotional vs. Emotionally Stable	4.76	5.33	5.33	6.08	5.39	5.84
Humble vs. Assertive	5.55	6.52	5.53	6.19	5.32	5.76
Sober vs. Happy-Go-Lucky	5.13	6.62	4.20	5.14	4.43	6.14
Expedient vs. Conscientious	6.45	5.76	6.27	6.22	7.07	6.34
Shy vs. Ventureseome	5.74	6.33	5.87	5.50	5.71	6.20
Toughminded vs. Tenderminded	6.07	6.00	4.73	5.50	6.32	5.68
Trusting vs. Suspicious	6.05	6.29	6.00	5.72	6.46	5.60

Table 1 (continued)

Variable	Social Sciences		Natural Science		Non-Science	
	Black	White	Black	White	Black	White
Practical vs. Imaginative	4.95	5.38	3.33	4.97	4.29	4.82
Forthright vs. Astute	6.21	5.00	6.20	5.78	6.68	6.10
Self-Assured vs. Apprehensive	5.76	5.52	5.13	5.17	6.07	5.16
Conservative vs. Experimenting	6.37	6.00	5.53	5.42	5.93	5.40
Group Dependent vs. Self-Sufficient	5.58	5.76	5.40	6.58	6.11	6.18
Undisciplined vs. Self-Control	6.47	5.52	6.67	6.11	6.96	6.42
Relaxed vs. Tense	4.92	6.19	5.40	5.53	5.32	5.52
Extraversion	5.55	6.44	5.60	5.27	5.08	5.95
Anxiety	5.66	5.94	5.55	5.31	5.88	5.43
Tough Poise	5.63	6.33	5.92	5.87	5.36	5.58
Independence	5.58	6.00	4.78	5.84	5.04	5.61

Table 2

Group Centroids by Race and Major

	Function 1	Function 2
White Social Science	- .76	.82
White Natural Science	-1.21	.96
White Non-science	- .99	.26
Black Social Science	1.73	- .35
Black Natural Science	.11	-1.11
Black Non-science	1.48	-1.23

W.F.U.

Table 3

Percentage of Correct Classification by Race and Major

	Percent
White Social Science	62
White Natural Science	58
White Non-science	58
Black Social Science	68
Black Natural Science	67
Black Non-science	64

Table 4

Race and College Major Differences on Personality, Attitudes and Social Variables

Variable	F-value Race	College Major
16 PF		
Reserved vs. Outgoing		2.95*
Nonintelligent vs. Intelligent	49.88***	
Sober vs. Happy-Go-Lucky	6.08**	6.74***
Practical vs. Imaginative	4.07*	3.02*
Conservative vs. Experimenting	4.54*	
Undisciplined vs. Self-control	5.50*	
BSRI		4.25*
Birth Order	7.56**	
# Siblings	13.67***	

*$p < .05$

**$p < .01$

***$p < .001$

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Table 5

Race by College Major Differences on Personality and Social Variables

	white	black	t
Natural Science			
Nonintelligent vs. Intelligent	6.81	4.26	4.65***
Practical vs. Imaginative	4.89	3.57	2.81**
Group Dependent vs. Self-sufficient	6.54	5.52	2.00*
Social Class	19.24	32.63	-3.55***
Social Science			
Nonintelligent vs. Intelligent	6.71	4.58	4.10***
Humble vs. Assertive	6.52	5.61	2.12*
Sober vs. Happy-go-Lucky	6.62	5.17	2.60**
Forthright vs. Astute	5.00	6.29	-2.27
Relaxed vs. Tense	6.19	5.04	2.60**
Birth Order	1.81	3.07	-2.88**
Social Class	20.86	45.69	-5.96***
Siblings	2.76	4.24	-3.27**
Non-Science			
Nonintelligent vs. Intelligent	6.22	4.06	5.56***
Sober vs. Happy-go-Lucky	6.12	4.52	4.00***
Trusting vs. Suspicious	5.63	6.65	-2.63**
Self Assured vs. Apprenhensive	5.10	6.00	-2.25*
Social Class	20.67	49.27	-9.18***
Siblings	3.27	4.80	-3.65***

*$p < .05$

**$p < .01$

***$p < .001$

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Figure 1. Centroids for first two discriminant functions.